Indoor Honking and Indication mechanisms in Smart Cars

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Introduction

- Humans and Animals affected **mentally,physically and psychologically** by noise pollution.

- Excessive honking will lead to distraction and consequently cause **accidents**.

- **Blind spot** caused accidents will reduce (8 L/year).

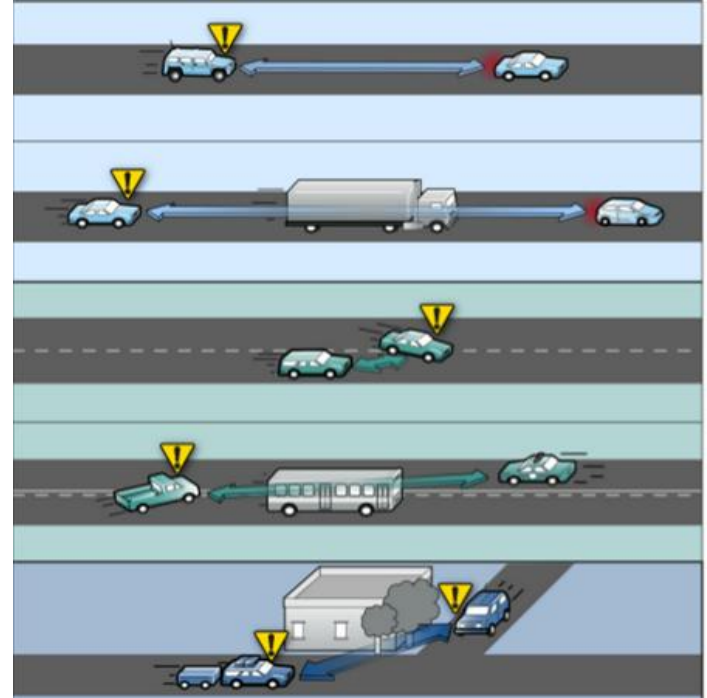- **Pedestrians** are unnecessarily affected by vehicular honking.

Overall Objective:

Elimination of **noise pollution** through indoor signalling using **VANET**.
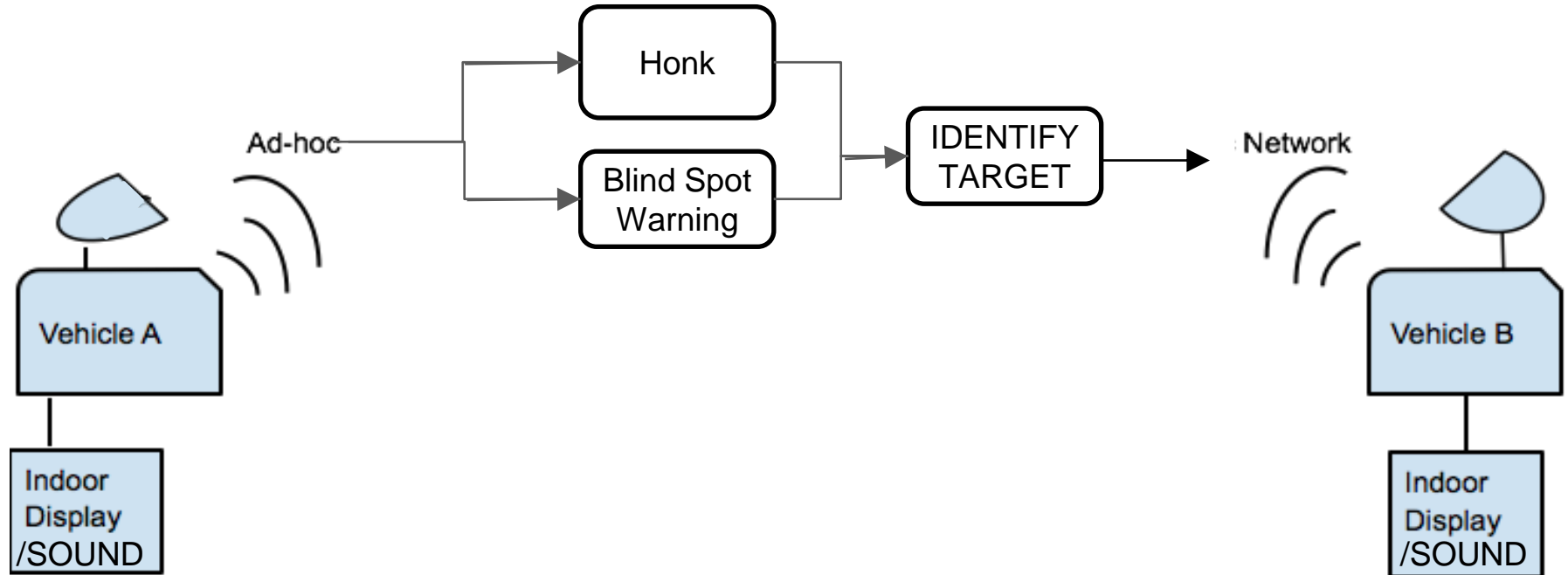
LITERATURE SURVEY

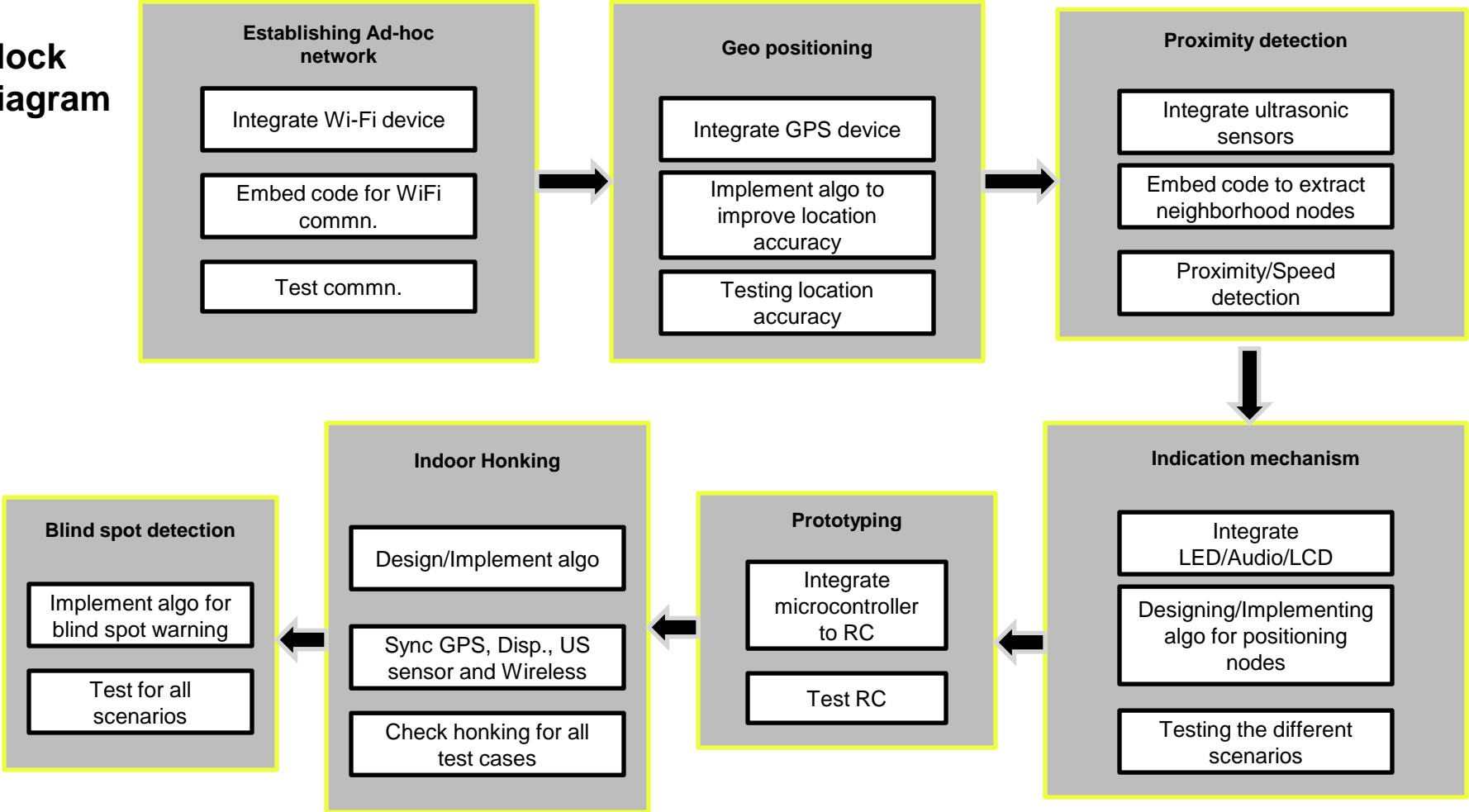| PAPER	CONCEPTS DISCUSSED
Saif Al-Sultan[,] [,]Moath M. Al-Doori ,Ali H. Al-Bayatti ,Hussien Zedan *A comprehensive survey on vehicular Ad Hoc network* Elsevier Journal of Network and Computer Applications Volume 37, January 2014, Pages 380–392	This paper distinguishes the main features surrounding VANET in one solid document, without the need to go through other relevant papers and articles, starting from VANET architecture and ending up with the most appropriate simulation tools to simulate VANET protocols and applications.
K. Golestan ,F. Sattar[,] [,]F. Karray ,M. Kamel ,S. Seifzadeh *Localization in vehicular ad hoc networks using data fusion and V2V communication,*Elsevier Journal of Computer Communication, July 2015	In this paper, a new cooperative approach dealing with the localization problem in VANETs is proposed.
M. Isabel Sanchez, Marco Gramaglia, Carlos J. Bernardos, Antonio de la Oliva, Maria Calderon On the implementation, deployment and evaluation of a networking protocol for VANETs: The VARON case, Elsevier Journal of ad hoc networks, February 2014	In this work, we have fully implemented it, first on a lab-based environment, and then in a real-life test bed. This long and exhausting process has shown that some common assumptions do not necessarily hold when evaluated under real situations, as well as taught us valuable lessons on how to design and conduct experiments with real vehicles

Vehicle to Vehicle Application and scenarios

- Forward collision warning

- Emergency electronic brake light warning

- Blind spot Warning

- Do not pass Warning

- Blind intersection Warning

Proposed System

Block Diagram

Establishing Ad-hoc network
- Integrate Wi-Fi device
- Embed code for WiFi commn.
- Test commn.

Geo positioning
- Integrate GPS device
- Implement algo to improve location accuracy
- Testing location accuracy

Proximity detection
- Integrate ultrasonic sensors
- Embed code to extract neighborhood nodes
- Proximity/Speed detection

Indication mechanism
- Integrate LED/Audio/LCD
- Designing/Implementing algo for positioning nodes
- Testing the different scenarios

Prototyping
- Integrate microcontroller to RC
- Test RC

Indoor Honking
- Design/Implement algo
- Sync GPS, Disp., US sensor and Wireless
- Check honking for all test cases

Blind spot detection
- Implement algo for blind spot warning
- Test for all scenarios
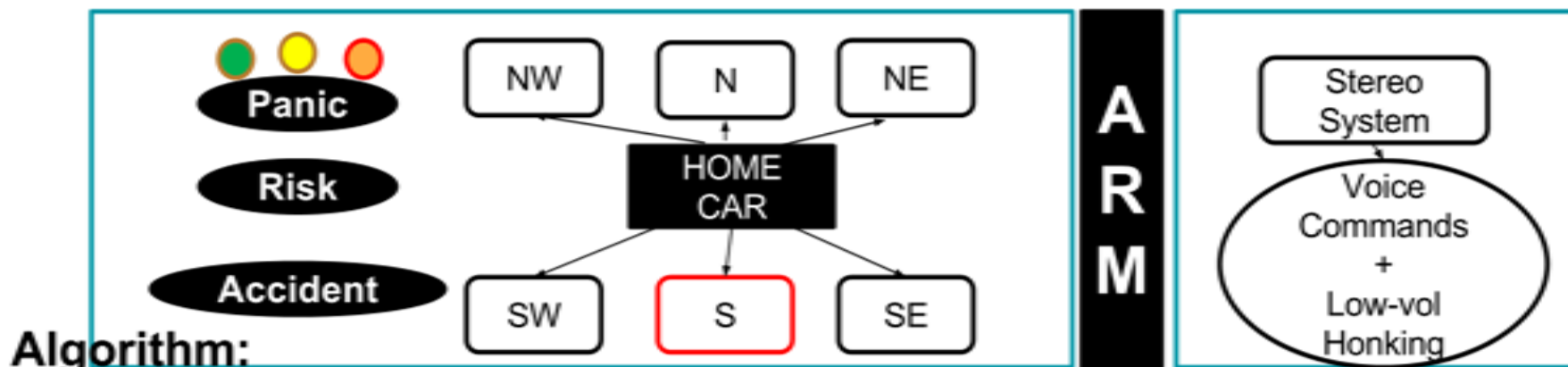
Structural and Functional details

- Low cost AD-HOC –V2V / InVANETs (Intelligent Vehicular Ad hoc networks)

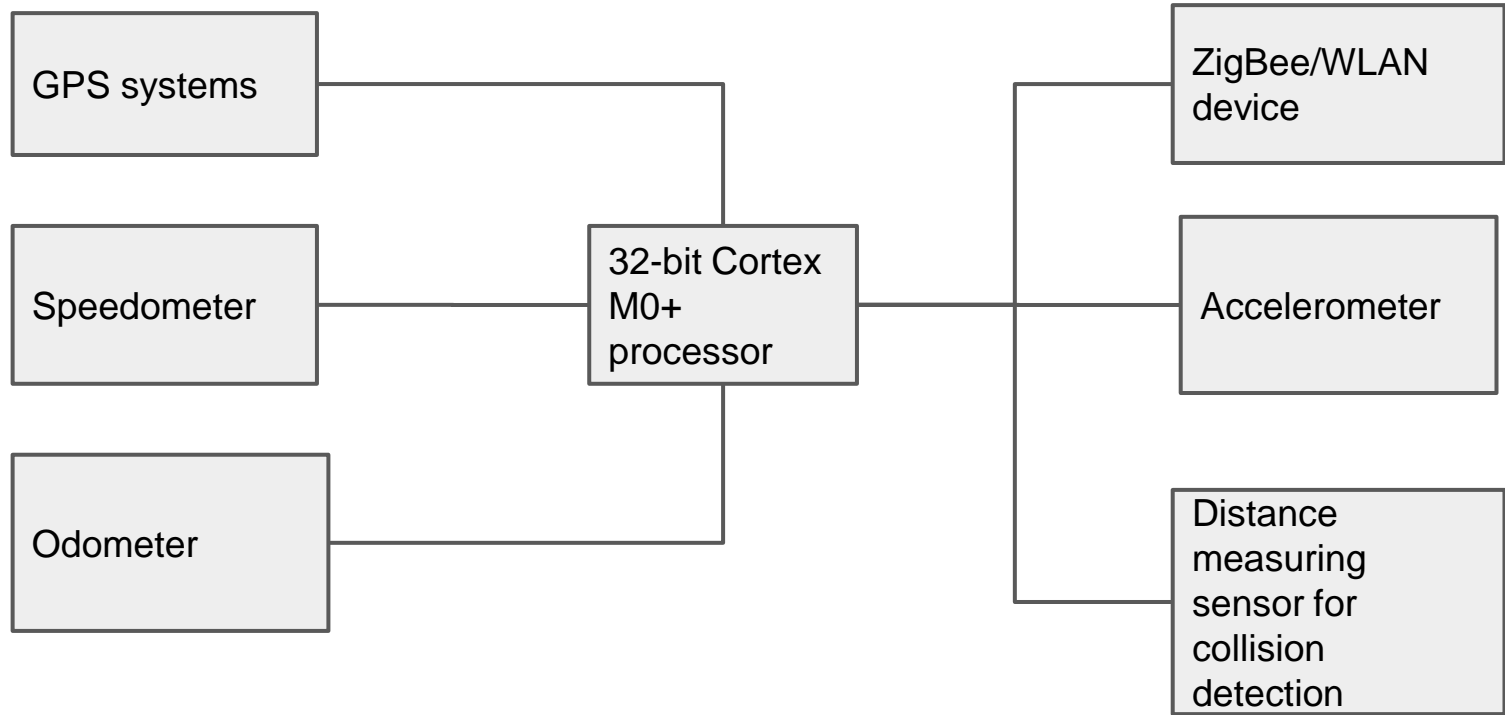**DISPLAY(OPTIONAL)**   **AUDIO**

Algorithm:

Use Ad hoc On Demand Distance Vector Routing Protocol to identify neighbour vehicles, And connect them to indoor screening and sound systems.

Device: Standard WiFi device that can form ad-hoc networks; Display-Phone.

Architecture of device

GPS systems

Speedometer

Odometer

32-bit Cortex M0+ processor

ZigBee/WLAN device

Accelerometer

Distance measuring sensor for collision detection

Module Description

Establishing Ad Hoc Network:

- Wi-Fi device is connected to the microcontroller

- code for the device is embedded into the microcontroller

- communication is tested.

Geo Positioning:

- GPS device is attached to the microcontroller

- Algorithm for localized accuracy of the given location is embedded

- Testing geo position with location.

Module Description

Proximity Detection:

Integrate the Ultrasonic sensor to the microcontroller and embed code to extract proximity of neighbour nodes thus enabling to measure the speed and proximity of nearby object.

Indication Mechanism:

Embed display and audio devices to the microcontroller to give information about the indication that is about to occur. This mechanisms are rigorously tested to prevent faults.

Module Description

Prototyping:

A prototype and miniaturized version of the car is created by embedding the microcontroller along with the devices to the RC car and tested.

Honking:

Design and implement algorithm for indoor honking by syncing GPS, Wireless, Ultrasonic and display devices.

Blind Spot Detection:

Implement algorithm for blind spot detection and test various scenarios.

Merits

- Increase concentration

- V2V- Smaller reaction time than sensors; transmit messages about a vehicle's speed, heading, brake status, etc

- No reliance of pre-existing Infrastructure.

- Avoid noise induced health problems to pedestrians.

- Display Capability -Quick location of honk Initiator.

- Audio Capability -(Minimal Distraction)

- Prioritisation of Emergency Vehicles.

Stakeholders

- <u>User</u>: Drivers of all kinds of vehicles

- <u>Authorities</u>: Traffic Department (Government), Transport Department.

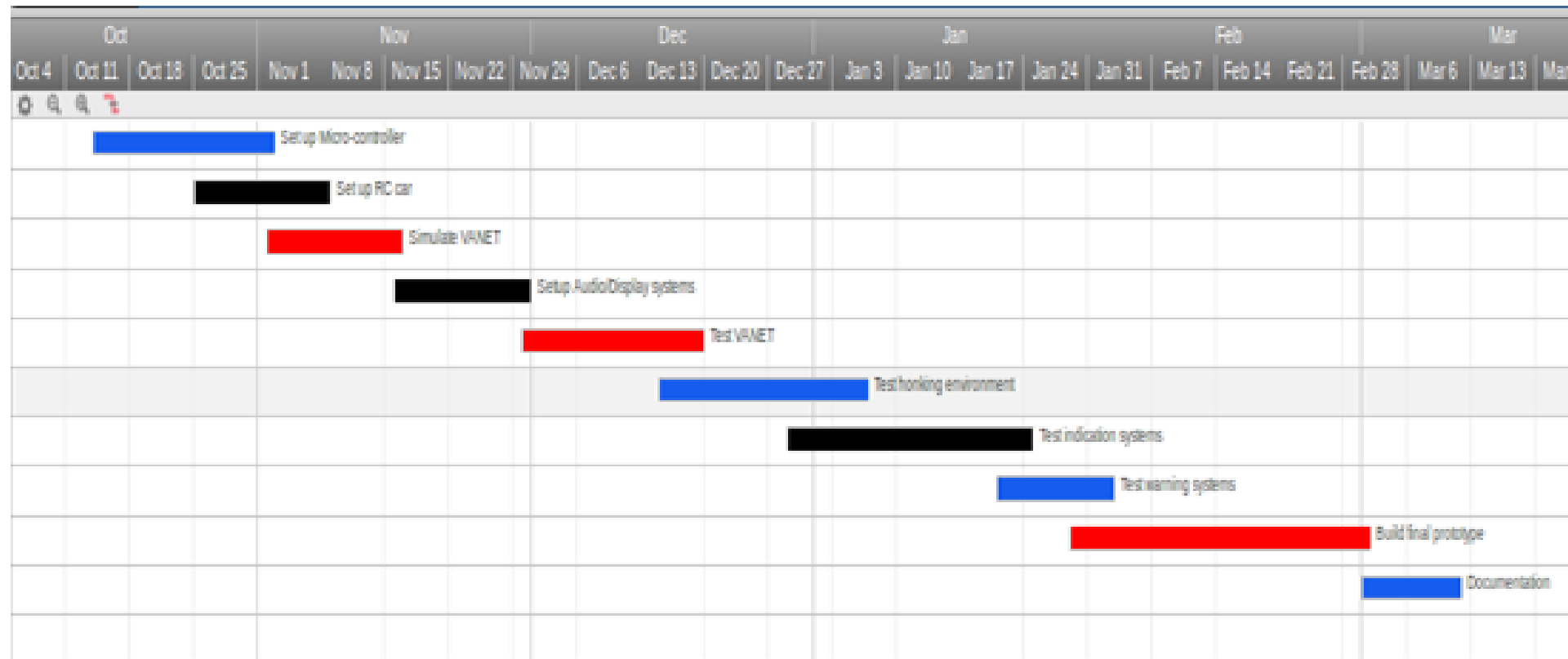- <u>Industries</u>: Transportation Vehicle industry.

Gantt Chart

	AP		EB		Bhags

	Oct				Nov					Dec				Jan					Feb				Mar		
	Oct 4	Oct 11	Oct 18	Oct 25	Nov 1	Nov 8	Nov 15	Nov 22	Nov 29	Dec 6	Dec 13	Dec 20	Dec 27	Jan 3	Jan 10	Jan 17	Jan 24	Jan 31	Feb 7	Feb 14	Feb 21	Feb 28	Mar 6	Mar 13	Mar

Setup Micro-controller

Setup RC car

Simulate VANET

Setup Audio/Display systems

Test VANET

Test hooking environment

Test indication systems

Test warning systems

Build final prototype

Documentation

References

[1] Ansari, K.*,* Yanming Feng,Maolin Tang *A runtime integrity monitoring framework for real-time relative positioning systems based on GPS and DSRC,* IEEE Transactions on Intelligent Transportation Systems, 16(2), pp. 980- 992,

[2] K. Golestan ,F. Sattar, , ,F. Karray ,M. Kamel ,S. Seifzadeh *Localization in vehicular ad hoc networks using data fusion and V2V communication,*Elsevier Journal of Computer Communication, July 2015

[3] Saif Al-Sultan, , ,Moath M. Al-Doori ,Ali H. Al-Bayatti ,Hussien Zedan, *A comprehensive survey on vehicular Ad Hoc network* Elsevier Journal of Network and Computer Applications Volume 37, January 2014, Pages 380–392